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PART II

FEDERAL ENERGY ADMINISTRATION

■

ENERGY CONSERVATION PROGRAM

Electric Refrigerators, Refrigerator-Freezers, Freezers, Clothes Dryers, and Television Sets; Test Procedures

Title 10—Energy

CHAPTER II—FEDERAL ENERGY ADMINISTRATION

PART 430—ENERGY CONSERVATION PROGRAM FOR APPLIANCES

Test Procedures for Electric Refrigerators and Electric Refrigerator-Freezers, and Freezers

AGENCY: Federal Energy Administration.

ACTION: Final rule.

SUMMARY: This rule prescribes final test procedures for electric refrigerators, electric refrigerator-freezers, and freezers. Appliance test procedures are one element of the appliance energy efficiency program required by the Energy Policy and Conservation Act.

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SUPPLEMENTARY INFORMATION:

A. Background

The Federal Energy Administration (FEA) hereby amends Part 430, Chapter II of Title 10, Code of Federal Regulations, in order to prescribe test procedures for electric refrigerators, electric refrigerator-freezers, and freezers, pursuant to section 323 (42 U.S.C. 6293) of the Energy Policy and Conservation Act (Act) (Pub. L. 94–163). These test procedures were proposed by notice issued April 21, 1977 (42 FR 21584, April 17, 1977), and a public hearing on the proposed test procedures was held on June 14, 1977. The definitions of "refrigerator," "refrigerator-freezer," and "freezer" were proposed at 41 FR 19980, May 14, 1976, but these definitions have been revised in response to public comments, as discussed below.

By notice issued May 24, 1977 (42 FR 27896, June 1, 1977), FEA established Subparts A and B of Part 430, Chapter II of Title 10, Code of Federal Regulations. Certain definitions and general provisions applicable to the Energy Conservation Program For Appliances have been promulgated in Subpart A. Final test procedures for room air conditioners and dishwashers have been prescribed in Subpart B. In addition to the test procedures for electric refrigerators, electric refrigerator-freezers, and freezers prescribed today, the final test procedures for clothes dryers and television sets are also being prescribed by separate notices. Several other test procedures have been proposed for inclusion in Subpart B. FEA has also proposed a Subpart C for appliance energy efficiency improvement targets. An outline of the provisions of Part 430 which have so far been established, including provisions in today's notices, is as follows:

SUBPART A—GENERAL PROVISIONS

Sec.
430.1 Purpose and Scope.
430.2 Definitions.

SUBPART B—TEST PROCEDURES

430.21 Purpose and Scope.
430.22 Test Procedures for Measures of Energy Consumption:
(a) Refrigerators and refrigerator-freezers
(b) Freezers.
(c) Dishwashers.
(d) Clothes dryers.
* * * * *
(f) Room air conditioners
* * * * *
(h) Television sets.
430.23 Units to be Tested [Reserved]
430.24 Representations Regarding Measures of Energy Consumption
(a) Refrigerators and refrigerator-freezers.
(b) Freezers.
(c) Dishwashers.
(d) Clothes dryers.
* * * * *
(f) Room air conditioners.
* * * * *
(h) Television sets.

APPENDICES TO SUBPART B

Appendix A1—Uniform Test Method for Measuring the Energy Consumption of Electric Refrigerators and Electric Refrigerator-Freezers.
* * * * *
Appendix B—Uniform Test Method for Measuring the Energy Consumption of Freezers.
Appendix C—Uniform Test Method for Measuring the Energy Consumption of Dishwashers.
Appendix D—Uniform Test Method for Measuring the Energy Consumption of Clothes Dryers.
* * * * *
Appendix F—Uniform Test Method for Measuring the Energy Consumption of Room Air Conditioners.
* * * * *
Appendix H—Uniform Test Method for Measuring the Energy Consumption of Television Sets.

B. Discussion of Comments

Comments were received from industry a trade association, and a state government. The major issues raised by the comments are discussed below.

1. TYPE OF ENERGY INPUT

Comments were received which pointed out that the proposed definition of "basic model" for refrigerators and refrigerator-freezers referred to "electrical characteristics" of covered products. These comments questioned whether units using a non-electrical energy input were intended to be covered by the proposed test procedures.

At the time of publication of the proposed test procedures, FEA believed that refrigerators and refrigerators-freezers using an energy source other than electricity were not to any significant extent distributed in commerce. Subsequently FEA has learned that a significant number of gas refrigeration products are manufactured, primarily for use in mobile homes and recreational vehicles, and therefore it is asking NBS to develop test procedures for these covered products.

The test procedures prescribed today for electric refrigerators and electric refrigerator-freezers reflect minor editorial and definitional changes which were necessary to clarify that these procedures apply only to electric refrigerators and electric refrigerator-freezers. This entailed redefining "refrigerator" and "refrigerator-freezer" and modifying the proposed definitions to apply only to the class of electric refrigerators and electric refrigerator-freezers. Section 323 of the Act authorizes the development of test procedures for classes of a covered product type. Test procedures for the class of gas refrigerators and gas refrigerator-freezers will be proposed as soon as practicable, in keeping with the notice issued July 22, 1976 (41 FR 31237, July 27, 1976) which delayed the proposal of test procedures for refrigerators and refrigerator-freezers beyond the date contemplated by the Act.

Because FEA is unaware of any freezers intended for personal use or consumption which use an energy source other than electricity, it has not asked NBS to develop any additional test procedures for freezers. The test procedures prescribed today for freezers, however, do reflect a minor definitional change to indicate that only electric freezers are presently intended to be covered by these test procedures.

2. ANNUAL OPERATING COST

Several comments suggested that a 50-percent use credit for an antisweat heater switch, such as the credit allowed in the energy factor calculations, also be allowed in the estimated annual operating cost calculations. FEA agrees that such an adjustment of the estimated annual operating cost calculations is necessary if the estimated annual operating cost figure is to be logically consistent with the energy factor. Without the adjustment, two products which are identical except for an antisweat heater switch on one would have the same annual operating cost figure, but the unit with the antisweat heater switch would have a lower energy factor. This would be confusing to consumers. Therefore, the estimated annual operating cost for electric refrigerators, electric refrigerator-freezers, and freezers has been amended in §§ 430.22(a)(1) and 430.22(b)(1) to reflect these changes.

One comment stated that no credit should be applied either to the energy factor or to the cost of operation, because such a credit would be a disincentive for manufacturers to remove the need for antisweat heaters (e.g., by improving the insulation of their products). However, NBS has verified that the antisweat heater switch is indeed used when available in refrigeration

products, and that such products therefore use less energy than similar units without the switch. For these reasons, FEA has determined that a use credit for an antisweat heater switch is appropriate both for the annual operating cost and for the energy factor calculations.

Several comments suggested that the use credit should be a figure other than 50 percent, but no supporting information was supplied which was not previously considered in arriving at the 50 percent credit recommended by NBS and adopted by FEA as best reflecting actual consumer use of antisweat heaters.

One comment suggested that monthly operating cost be included as another measure of energy consumption. FEA does not believe that a measure of monthly operating cost would significantly add to the information conveyed by the estimated annual operating cost, the inclusion of which is mandated by the Act.

3. ENERGY FACTOR FOR FREEZERS

Some comments suggested that calculation of an unadjusted energy factor for freezers would lead consumers to believe that freezers are less efficient than electric refrigerators and electric refrigerator-freezers. These comments noted that the energy factor for electric refrigerators having a 15° F. freezer compartment is adjusted by a factor of 1.44, and that the energy factor for electric refrigerator-freezers having a 5° F. freezer compartment is adjusted by a factor of 1.63 FEA has determined that consistency requires that the calculation of the energy factor for freezers include an adjustment factor of 1.73, in order to compensate for the lower working temperature of freezers. The energy factor for freezers has been amended in § 430.22(b)(4) to reflect this change.

Because neither the energy factor nor the adjusted volume is used in the determination of the estimated annual operating cost, this adjustment factor will not affect those calculations. The 1972 baseline efficiency on which the proposed energy efficiency improvement target for freezers (42 FR 36648, July 15, 1977) was based, will be affected, however. As a result, appropriate changes will be made in the energy factors associated with the target for freezers.

4. ADJUSTING THE ENERGY FACTOR

One commenter suggested that the concepts of an adjusted refrigerated volume and an energy factor be abandoned on the grounds that they compromise manufacturers' incentive to add extra insulation to freezer compartments and so discourage the use of optimal insulation thicknesses. While the concept of the energy factor as proposed is imperfect, FEA believes that the alternative of allowing no compensation for the lower operating temperatures of freezing compartments places at an unreasonable disadvantage those units with higher ratios of freezer volume to refrigerator volume.

In theory, a 63-percent increase in freezer compartment insulation would obviate the need for an adjustment factor. In practice, however, the conductance of the freezer compartment insulation of most currently available refrigerator-freezers is within 25 percent of the conductance of the refrigerator compartment insulation. For this reason, FEA believes that the concept of an adjusted energy factor is appropriate as a measure of energy consumption which will assist consumers in making purchasing decisions, as required by the Act. As noted above, FEA has decided not only to retain an adjusted energy factor for electric refrigerators and electric refrigerator-freezers, but also to extend this concept to freezers.

The same commenter also suggested that the energy factor favors larger units because the major heat transfer mechanisms are more dependent upon area than volume. However, the utility of a refrigeration product is a reflection of its volume and not its surface area, and the measure of efficiency should reflect this utility. For example, the energy factor correctly indicates that one large unit is preferable to two smaller units with the same total volume.

5. CREDIT FOR OTHER ENERGY SAVING DEVICES

FEA and NBS are currently studying the advisability of a credit for a switch to interrupt operation of a unit's evaporator fan when the unit's door is open. Special credit may be appropriate because the test procedures prescribed today involve a cycle type with doors remaining closed, so that any advantages of such a device would not be reflected. FEA is prepared to amend these test procedures if further developments indicate that energy saving devices are given inappropriate credit due to differences between the test procedures and actual consumer use.

6. TEST VOLTAGE

Several comments were directed to proposed § 430.23 (a)(3) and (b)(3), which required basic models having a dual voltage rating to be tested at each design voltage. All household electric refrigerators, electric refrigerator-freezers, and freezers in the United States are designed to operate at a nominal 115 volt, 60 HZ circuit, and any other nameplate voltage rating is included solely for use outside the United States. Because FEA does not intend to require testing under conditions not found in the United States, this requirement is determined to be unduly burdensome and has been deleted.

7. NUMBER OF UNITS TO BE TESTED

Some comments expressed objections to the sampling provision for electric refrigerators, electric refrigerator-freezers, and freezers. Proposed § 430.23 (a) and (b) provided for sampling of each basic model to be tested when testing of electric refrigerators, electric refrigerator-freezers or freezers is required by the Act or by program regulations of agencies responsible for administering the Act. This provision was intended both to provide an acceptable level of assurance that test results are applicable to any entire basic model for which testing is required and to minimize the testing burden on manufacturers.

Test procedures prescribed under section 323 of the Act are intended ultimately to be used, for example, for labeling under section 324, for monitoring the progress of manufacturers toward accomplishing the energy efficiency improvement targets under section 325, and for enforcement testing under section 326. These aspects of the appliance program have not, however, been implemented. It is quite possible that the objectives of appliance testing under each of these parts of the program, as well as the instructions as to how a test procedure should be applied (e.g., sampling of production units), may differ. FEA, NBS, and FTC are continuing to evaluate the appropriate method or methods for sampling the units to be tested in order to comply with the statute and satisfy all of the different elements of the appliance program.

While the various parts of the appliance program identified above are not in effect at this time, section 323(c) of the Act provides:

> Effective 90 days after a test procedure rule applicable to a covered product is prescribed under this section, no manufacturer, distributor, retailer or private labeler may make any representation—
>
> (1) In writing including a representation on a label, or
>
> (2) In any broadcast advertisement, respecting the energy consumption of such product, unless such product has been tested in accordance with such test procedure and such representation fairly discloses the results of such testing.

In order to eliminate the problems discussed above associated with a general sampling provision, § 430.23 has been reserved in the final test procedures, and sampling requirements which apply only for purposes of advertising have been reorganized into § 430.24 (a) and (b) of the final test procedures. Sections 430.24 (a) and (b) are similar to proposed § 430.23 (a) and (b), but contain several revisions. Most notably, the units tested are required to be representative of production units or actual production units. This change is intended to reduce the burden which might be caused by requiring post-production rating of basic models in every instance of testing pursuant to section 323(c) of the Act.

Until a labeling rule has been implemented pursuant to section 324, manufacturers are not required to test unless they choose to make representations regarding a measure of energy consumption identified in or based upon section 430.22 (a) and (b). It should also be emphasized that the test procedures prescribed today apply only to the initial rating of a basic model.

In addition, certain technical changes have been made in sampling language. Specifically, there is to be 95 percent confidence that the true mean of any measure of the basic model lies within

±10 percent of the mean of such measure of the sample. Comments pertaining to several proposed test procedures criticized the language of the proposed sampling provisions. These comments suggested that a sampling provision should refer to the estimate of the mean rather than to the true mean. FEA has considered this suggestion and has determined that the language prescribed today is more technically correct because the statistical measures "estimate of the mean" and "mean of the sample" are generally considered to be identical. The final test procedures for room air conditioners and dishwashers used both these terms in a manner that could be confusing, and the language prescribed today is intended to eliminate this possibility of confusion.

8. PRODUCTS COVERED BY THE FINAL TEST PROCEDURES

Some comments suggested that a few products cannot be tested satisfactorily using the proposed test procedures. FEA is prepared to amend the test procedures as new products or new design features may require. No specific details have been provided, however, to justify any such amendments of the proposed test procedures at this time.

One commenter specifically stated that compact refrigerators could not be tested accurately using the proposed test procedures. No particular feature of compact refrigerators was cited, however, which would render the test procedures inappropriate for testing these units.

9. AMBIENT TEMPERATURES

It was suggested that the test procedures be amended to specify that tests be conducted at an ambient temperature of 104° F. Although such a test would provide a useful performance criterion, the change from the currently specified ambient temperature of 90° F. would not more accurately reflect energy efficiency. Therefore, this suggestion was not adopted.

10. NORMAL CYCLE

Several comments suggested that the use of the word "normal" in the term "normal cycle" implied that that cycle was the usual cycle or the cycle expected to be used most often. Commenters therefore took exception to the definition of "normal cycle" which stated that any anti-sweat heater switch would be in the highest energy consuming position during this cycle. The term "standard cycle" was offered as a substitute. FEA has adopted this change.

Suggestions were also made to specify a "standard cycle-maximum" and a "standard cycle-minimum." FEA wishes to encourage maximum use of energy-saving devices such as anti-sweat heaters. Evidence was elicited during the public comment period which indicated that anti-sweat heater switches tend to remain in the position set at the factory. In order to encourage manufacturers to ship refrigeration products with the anti-sweat heater switch in the lowest energy consuming position, FEA has determined that a cycle in which the switch is in the same position as set at the factory is preferable to a "standard cycle-minimum."

A suggestion that FEA more clearly specify the duration of test cycles has been adopted. A "cycle" refers to continuous operation of a unit for a period of 24 hours. However, test data may be based on test periods of less than 24 hours if corrected to correspond to a 24-hour period as specified in HRF-2-ECFT-1975.

11. CORRELATIVE TEST PROCEDURES

Several comments indicated that correlative methods have been developed by manufacturers of refrigeration products which yield virtually the same results as those obtained through the test procedures prescribed today. At this time FEA has not made a decision on the feasibility of allowing correlative testing. If additional data are submitted by individual manufacturers, FEA will examine the possibility of using correlative testing and will determine whether the Act would permit such methods to be used in lieu of the prescribed test procedures.

12. MISCELLANEOUS

After careful consideration of all the comments and further consultation with NBS and FTC, FEA has incorporated in the final rule some minor changes that were not discussed above.

C. Regulations Prescribed

1. TEST PROCEDURES

The test procedures for electric refrigerators, electric refrigerator-freezers, and freezers prescribed today are included in Subpart B and are substantially the same as those proposed, with the exception of the changes discussed above. As with the proposal procedures, the test methodology incorporates the approach contained in the Association of Home Appliance Manufacturers (AHAM) Standard HRF-2-ECFT-1975 for measuring average energy consumption per cycle type, and the American National Standard (ANS) B38.1-1970 for measuring net refrigerated volume. For purposes of FEA's program, the incorporated standards remain applicable as presently written regardless of any subsequent amendment of the ANS or AHAM Standard, until further amendment by FEA.

Under the requirements of section 32(c) of the Federal Energy Administration Act of 1974 (15 U.S.C. 761 et. seq.) as amended by section 9 of the Federal Energy Administration Authorization Act of 1977 (Pub. L. 95-70), the Administrator of FEA is to consult with the Attorney General and the Chairman of the Federal Trade Commission concerning the impact on competition of any rules prescribed by FEA which utilize or incorporate any commercial standards.

The Administrator has transmitted copies of the test procedures for electric refrigerators, electric refrigerator-freezers, and freezers, which incorporate the above-mentioned commercial standards, to the Attorney General and the Chairman of the Federal Trade Commission for their comments concerning the impact of such standards on competition, in accordance with section 32(c). Neither official has any comments, nor do they recommend against the incorporation or use of these commercial standards in the final test procedures for electric refrigerators, electric refrigerator-freezers, and freezers.

2. GENERAL PROVISIONS

Also prescribed today are definitions of "electric refrigerator," "electric refrigerator-freezer," "freezer," "refrigerator," and "refrigerator-freezer." The definition of the term "basic model" for refrigerators and refrigerator-freezers, and for freezers, has been added. Some of these definitions were previously proposed in Subpart A (41 FR 19980, May 14, 1976; 42 FR 21586, April 27, 1977). Comments which were received regarding these definitions, and the issues which they raised, have been discussed earlier in this notice.

3. APPLICATION OF TEST PROCEDURES

As discussed previously, the final test procedures prescribed today must be applied before representations regarding a measure of energy consumption can be made. Because the purposes and needs of the different elements of the appliance program (e.g., labeling, targets) vary, application of the standard test methodology prescribed today may differ in some respects for each program element. It is expected that instructions on how to apply the standard test methodology to these other elements of the appliance program will be proposed for comment in the near future.

The requirements of § 430.24 (a) and (b) of the final regulations apply until such time as final labeling requirements for a particular measure of energy consumption and the associated test procedure application provision are prescribed. After that time, all representations regarding a measure of energy consumption covered by a labeling rule must be the same as represented on the label.

D. Unit Costs of Energy

Under section 323(b)(2) of the Act, FEA is to provide manufacturers information as to the representative average unit costs of energy. This information was provided by notice issued July 11, 1977 (42 FR 36549, July 15, 1977).

E. Preemption

Today's rulemaking prescribing final test procedures for electric refrigerators, electric refrigerator-freezers, and freezers supersedes any State regulation to the extent required by section 327 of the Act. Pursuant to section 327, all State regulations which provide for the disclosure of information with respect to any measure of energy consumption of electric refrigerators, electric refrigerator-freezers, or freezers, or which provide for any energy efficiency standard or similar requirement with respect to energy efficiency or energy use of electric refrigerators, electric refrigerator-freezers, or freezers, must now employ

test procedures identical to those specified in today's final rule.

(Energy Policy and Conservation Act, Pub. L. 94-163, as amended by Pub. L. 94-385; Federal Energy Administration Act of 1974, Pub. L. 93-275, as amended by Pub. L. 94-385; E.O. 11790, 39 FR 23185)

In consideration of the foregoing, Part 430 of Chapter II of Title 10, Code of Federal Regulations, is amended as set forth below, effective October 17, 1977.

Issued in Washington, D.C., September 8, 1977.

ERIC J. FYGI,
Acting General Counsel,
Federal Energy Administration.

1. Section 430.2 is amended by adding subparagraphs (1) and (2) as part of the definition of "Basic model," and by adding in appropriate alphabetical order definitions of "electric refrigerator," "electric refrigerator-freezer," "freezer," "refrigerator," and "refrigerator-freezer" to read as follows:

§ 430.2 Definitions.

* * * * *

"Basic model" means all units of a given type of covered product (or class thereof) manufactured by one manufacturer and—

(1) With respect to refrigerators and refrigerator-freezers, which have the same primary energy source, which have electrical characteristics that are essentially identical, and which do not have any differing physical or functional characteristics that affect energy consumption.

(2) With respect to freezers, which have the same primary energy source, which have electrical characteristics that are essentially identical, and which do not have any differing physical or functional characteristics that affect energy consumption.

* * * * *

"Electric refrigerator" means a cabinet designed for the refrigerated storage of food at temperatures above 32° F., and having a source of refrigeration requiring an electrical energy input only. It may include a compartment for the freezing and storage of food at temperatures below 32° F. but does not provide a separate low temperature compartment designed for the freezing of and the long term storage of food at temperatures below 8° F. It has only one exterior door, but it may have interior doors on compartments.

* * * * *

"Electric refrigerator-freezer" means a cabinet which consists of two or more compartments with at least one of the compartments designed for the refrigerated storage of foods at temperatures above 32° F. and with at least one of the compartments designed for the freezing of and the storage of frozen foods at temperatures of 8° F. or below and may be capable of being adjusted by the user to a temperature of 0° F. or below. The source of refrigeration requires an electrical energy input only.

* * * * *

"Freezer" means a cabinet designed as a unit for the storage of food at temperatures of 0° F. or below, having the ability to freeze food, and having a source of refrigeration requiring an electrical energy input only.

"Refrigerator" means an electric refrigerator or a gas refrigerator.

* * * * *

"Refrigerator-freezer" means an electric refrigerator-freezer or a gas refrigerator-freezer.

* * * * *

2. Section 430.22 is amended by adding paragraph (a) and (b), to read as follows:

§ 430.22 Test procedures for measures of energy consumption.

(a) *Refrigerators and refrigerator-freezers.* (1) The estimated annual operating cost for electric refrigerators and electric refrigerator-freezers without an anti-sweat heater switch shall be the product of the following three factors: (i) The representative average-use cycle of 365 cycles per year, (ii) the average per-cycle energy consumption for the standard cycle in kilowatt-hours per cycle, determined according to 4.1 of Appendix A1 of this subpart, and (iii) the representative average unit cost in dollars per kilowatt-hour as provided by the Administrator, the resulting product then being rounded off to the nearest dollar per year.

(2) The estimated annual operating cost for electric refrigerators and electric refrigerator-freezers with an anti-sweat heater switch shall be the product of the following three factors: (i) The representative average-use cycle of 365 cycles per year, (ii) half the sum of the average per-cycle energy consumption for the standard cycle and the average per-cycle energy consumption for a test cycle type with the anti-sweat heater switch in the position set at the factory, each in kilowatt-hours per cycle, determined according to 4.1 of Appendix A1 of this subpart, and (iii) the representative average unit cost in dollars per kilowatt-hour as provided by the Administrator, the resulting product then being rounded off to the nearest dollar per year.

(3) The estimated annual operating cost for any other specified cycle type for electric refrigerators and electric refrigerator-freezers shall be the product of the following three factors: (i) The representative average-use cycle of 365 cycles per year, (ii) the average per-cycle energy consumption for the specified cycle type, determined according to 4.1 of Appendix A1 to this subpart, and (iii) the representative average unit cost in dollars per kilowatt-hour as provided by the Administrator, the resulting product then being rounded off to the nearest dollar per year.

(4) The energy factor for electric refrigerators and electric refrigerator-freezers, expressed in cubic feet per kilowatt-hour per cycle, shall be—

(i) For electric refrigerators and electric refrigerator-freezers not having an anti-sweat heater switch, the quotient of (A) the adjusted total volume in cubic feet, determined according to 4.2 of Appendix A1 of this subpart, divided by (B) the average per-cycle energy consumption for the standard cycle in kilowatt-hours per cycle, determined according to 4.1 of Appendix A1 of this subpart, the resulting quotient then being rounded off to the second decimal place, and

(ii) For electric refrigerators and electric refrigerator-freezers having an anti-sweat heater switch, the quotient of (A) the adjusted total volume in cubic feet, determined according to 4.2 of Appendix A1 of this subpart, divided by (B) half the sum of the average per-cycle energy consumption for the standard cycle and the average per-cycle energy consumption for a test cycle type with the anti-sweat heater switch in the position set at the factory, each in kilowatt-hours per cycle, determined according to 4.1 of Appendix A1 of this subpart, the resulting quotient then being rounded off to the second decimal place.

(5) Other useful measures of energy consumption for electric refrigerators and electric refrigerator-freezers shall be those measures of energy consumption for electric refrigerators and electric refrigerator-freezers which the Administrator determines are likely to assist consumers in making purchasing decisions and which are derived from the application of Appendix A1 of this subpart.

(b) *Freezers.* (1) The estimated annual operating cost for freezers without an anti-sweat heater switch shall be the product of the following three factors: (i) The representative average-use cycle of 365 cycles per year, (ii) the average per-cycle energy consumption for the standard cycle in kilowatt-hours per cycle, determined according to 4.1 of Appendix B of this subpart, and (iii) the representative average unit cost in dollars per kilowatt-hour as provided by the Administrator, the resulting product then being rounded off to the nearest dollar per year.

(2) The estimated annual operating cost for freezers with an anti-sweat heater switch shall be the product of the following three factors: (i) The representative average-use cycle of 365 cyles per year, (ii) half the sum of the average per-cycle energy consumption for the standard cycle and the average per-cycle energy consumption for a test cycle type with the anti-sweat heater switch in the position set at the factory, each in kilowatt-hours per cycle, determined according to 4.1 of Appendix B of this subpart, and (iii) the representative average unit cost in dollars per kilowatt-hour as provided by the Administrator, the resulting product then being rounded off to the nearest dollar per year.

(3) The estimated annual operating cost for any other specified cycle type for freezers shall be the product of the following three factors: (i) The representative average-use cycle of 365 cycles per year, (ii) the average per-cycle energy consumption for the specified cycle type, determined according to 4.1 of Appendix B of this subpart, and (iii) the

representative average unit cost in dollars per kilowatt-hour as provided by the Administrator, the resulting product then being rounded off to the nearest dollar per year.

(4) The energy factor for freezers, expressed in cubic feet per kilowatt-hour per cycle, shall be—

(i) For freezers not having an anti-sweat heater switch, the quotient of (A) the adjusted net refrigerated volume in cubic feet, determined according to 4.2 of Appendix B of this subpart, divided by (B) the average per-cycle energy consumption for the standard cycle in kilowatt-hours per cycle, determined according to 4.1 of Appendix B of this subpart, the resulting quotient then being rounded off to the second decimal place, and

(ii) For freezers having an anti-sweat heater switch, the quotient of (A) the adjusted net refrigerated volume in cubic feet, determined according to 4.2 of Appendix B of this subpart, divided by (B) half the sum of the average per-cycle energy consumption for the standard cycle and the average per-cycle energy consumption for a test cycle type with the anti-sweat switch in the position set at the factory, each in kilowatt-hours per cycle, determined according to 4.1 of Appendix B of this subpart, the resulting quotient then being rounded off to the second decimal place.

(5) Other useful measures of energy consumption for freezers shall be those measures of energy consumption for freezers which the Administrator determines are likely to assist consumers in making purchasing decisions and which are derived from the application of Appendix B of this subpart.

* * * * *

3. Section 430.24 is amended by adding paragraphs (a) and (b), to read as follows:

§ 430.24 Representations regarding measures of energy consumption.

(a) *Refrigerators and refrigerator-freezers.* (1) Except as provided in paragraph (a)(3) of this section, no manufacturer, distributor, retailer, or private labeler of electric refrigerators or electric refrigerator-freezers may make any representation with respect to or based upon a measure or measures of energy consumption described in § 430.22(a) unless a sample of sufficient size of each basic model for which such representation is made has been tested in accordance with applicable provisions of this subpart such that, for each such measure of energy consumption, there is 95 percent confidence that the true mean of such measures of the basic model lies within ±10 percent of the mean of such measures of the sample.

(2) The sample selected for paragraph (a)(1) of this section shall be comprised of units which are production units, or are representative of production units, of the basic model being tested.

(3) Whenever a rule applicable to electric refrigerators or electric refrigerator-freezers is prescribed under section 324 of the Act, this paragraph shall not apply to any label covered by such rule, and all representations of any measure of energy consumption covered by such rule shall be identical to the measure of energy consumption on the label.

(b) *Freezers.* (1) Except as provided in paragraph (b)(3) of this section, no manufacturer, distributor, retailer, or private labeler of freezers may make any representation with respect to or based upon a measure or measures of energy consumption described in § 430.22(b) unless a sample of sufficient size of each basic model for which such representation is made has been tested in accordance with applicable provisions of this subpart such that, for each such measure of energy consumption there is 95 percent confidence that the true mean of such measures of the basic model lies within ±10 percent of the mean of such measures of the sample.

(2) The sample selected for paragraph (b)(1) of this section shall be comprised of units which are production units, or are representative of production units, of the basic model being tested.

(3) Whenever a rule applicable to freezers is prescribed under section 324 of the Act, this paragraph shall not apply to any label covered by such rule, and all representations of any measure of energy consumption covered by such rule shall be identical to the measure of energy consumption on the label.

* * * * *

4. Subpart B of Part 430 is amended to add an Appendix A1, to read as follows:

APPENDIX A1—UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF ELECTRIC REFRIGERATORS AND ELECTRIC REFRIGERATOR-FREEZERS

1. DEFINITIONS

1.1 "Adjusted total volume" means the sum of (i) the net general refrigerated volume as defined in ANS B38.1–1970 in cubic feet, and (ii) the product of an adjustment factor and the net freezer refrigerated volume as defined in ANS B38.1–1970, in cubic feet.

1.2 "Anti-sweat heater" means a device incorporated into the design of a refrigerator or refrigerator-freezer to prevent the accumulation of moisture on exterior surfaces of the cabinet under conditions of high

1.3 "Cycle" means the operation of an electric refrigerator or electric refrigerator-freezer for a continuous period of 24 hours with the consumer-activated controls set so that the test conditions specified in HRF–2–ECFT–1975 are maintained.

1.4 "Cycle type" means the operation of an electric refrigerator or electric refrigerator-freezer for a continuous period of 24 hours, with the consumer-activated controls set to establish various operating characteristics.

1.5 "Standard cycle" means the cycle type in which the anti-sweat heater switch, when provided, is set in the highest energy consuming position.

2. TESTING CONDITIONS

2.1 *Operational conditions.* Install the electric refrigerator or electric refrigerator-freezer and maintain the operating conditions in accordance with the Association of Home Appliance Manufacturers (AHAM) Standard HRF–2–ECFT–1975. All references in HRF–2–ECFT–1975 to American National Standard (ANS) B38.1 shall be interpreted as references to ANS B38.1–1970.

3. TEST CYCLE AND MEASUREMENTS

3.1 *Test cycle.* Perform a test cycle type by establishing the testing conditions set forth in 2, testing the electric refrigerator or electric refrigerator-freezer in accordance with the AHAM Standard HRF–2–ECFT–1975. Test data may be based on test periods of less than 24 hours if corrected to correspond to a 24-hour test period as specified in HRF–2–ECFT–1975.

3.2 *Test measurements.* Measure electric refrigerator or electric refrigerator-freezer net refrigerated volume, V_n, expressed in cubic feet and defined, in accordance with ANS B38.1–1970, section 3.2 as:

$$V_n = V_f + V_g$$

where

V_f = net freezer refrigerated volume, in cubic feet

V_g = net general refrigerated volume, in cubic feet

3.3 *Reported values.* State the reported values of energy consumption in kilowatt-hours as determined in accordance with AHAM Standard HRF–2–ECFT–1975, and the net freezer refrigerated volume, net general refrigerated volume, and the net refrigerated volume (as defined in HRF–2–ECFT–1975), all in cubic feet, as determined in accordance with ANS B38.1–1970, Section 3.2.

4. CALCULATION OF DERIVED RESULTS FROM TEST MEASUREMENTS

4.1 *Average per-cycle energy consumption.* Calculate for the cycle type under test the average per-cycle energy consumption of electric refrigerators and electric refrigerator-freezers, expressed in kilowatt-hours per cycle, in accordance with AHAM Standard HRF–2–ECFT–1975.

4.2 *Adjusted total volume.*

4.2.1 *Electric refrigerators.* Calculate for electric refrigerators under test the adjusted total volume, V_{rr}, expressed in cubic feet and defined as:

$$V_{rr} = (V_f \times C_r) + V_g$$

where

V_f and V_g are defined in 3.2, and

C_r = adjustment factor of 1.44, dimensionless

4.2.2 *Electric refrigerator-freezers.* Calculate for electric refrigerator-freezers under test the adjusted total refrigerated volume, V_{rf}, expressed in cubic feet and defined as:

$$V_{rf} = (V_f \times C_{rf}) + V_g$$

where

V_f and V_g are defined in 3.2, and

C_{rf} = adjustment factor of 1.63, dimensionless

5. Subpart B of Part 430 is amended to add an Appendix B, to read as follows:

APPENDIX B—UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF FREEZERS

1. DEFINITIONS

1.1 "Anti-sweat heater" means a device incorporated into the design of a freezer to prevent the accumulation of moisture on exterior surfaces of the cabinet under conditions of high ambient humidity.

1.2 "Cycle" means the operation of a freezer for a continuous period of 24 hours with the consumer-activated controls preset so that the test conditions specified in HRF–2–ECFT–1975 are maintained.

1.3 "Cycle type" means the operation of a freezer for a continuous period of 24 hours with the consumer-activated controls set to establish various operating characteristics.

1.4 "Standard cycle" means the cycle type in which the anti-sweat heater switch, when provided, is set in the highest energy consuming position.

2. TESTING CONDITIONS

2.1 *Operational conditions.* Install the freezer and maintain the operating conditions in accordance with the Association of Home Appliance Manufacturers (AHAM) Standard HRF-2-ECFT-1975. All references in HRF-2-ECFT-1975 to American National Standard (ANS) B38.1 shall be interpreted as references to ANS B38.1-1970.

3. TEST CYCLE AND MEASUREMENTS

3.1 *Test cycle.* Perform a test cycle type by establishing the testing conditions set forth in 2, testing the freezers in accordance with the AHAM Standard HRF-2-ECFT-1975. Test data may be based on test periods of less than 24 hours if corrected to correspond to a 24-hour test period as specified in HRF-2-ECFT-1975.

3.2 *Test measurements.* Measure the net freezer refrigerated volume, in cubic feet, in accordance with ANS B38.1-1970, section 4.2.

3.3 *Report values.* State the reported values of energy consumption, E_t, expressed in kilowatt-hours, as determined in accordance with AHAM Standard HRF-2-ECFT-1975 and the net freezer refrigerated volume, in cubic feet, as determined in accordance with ANS B38.1-1970, section 4.2.

4. CALCULATION OF DERIVED RESULTS FROM TEST MEASUREMENTS

4.1 *Average per-cycle energy consumption.*

4.1.1 *Chest freezers.* Calculate for chest freezers under test the average per-cycle energy consumption, E_c, expressed in kilowatt-hours per cycle, and defined as:

$$E_c = E_t \times C_c$$

where

E_t is defined in 3.3, and
C_c = correction factor of 0.7, dimensionless

4.1.2 *Upright freezers.* Calculate for upright freezers under test the average per-cycle energy consumption, E_u, expressed in kilowatt-hours per cycle and defined as:

$$E_u = E_t \times C_u$$

where

E_t is defined in 3.3, and
C_u = correction factor of 0.85, dimensionless

4.2 *Adjusted net refrigerated volume.*

4.2.1 *Freezers.* Calculate for freezers under test, the adjusted net freezer refrigerated volume, V_{tf}, expressed in cubic feet and defined as:

$$V_{tf} = V_f \times C_f.$$

where

V_f = net freezer refrigerated volume from 3.2, and
C_f = adjustment factor of 1.73, dimensionless.

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PART 430—ENERGY CONSERVATION PROGRAM FOR APPLIANCES

Test Procedures for Clothes Dryers

AGENCY: Federal Energy Administration.

ACTION: Final rule.

SUMMARY: This rule prescribes final test procedures for clothes dryers. Appliance test procedures are one element of the appliance energy efficiency program required by the Energy Policy and Conservation Act.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

A. BACKGROUND

The Federal Energy Administration (FEA) hereby amends Part 430, Chapter II of Title 10, Code of Federal Regulations, in order to prescribe test procedures for clothes dryers pursuant to section 323 (42 U.S.C. 6293) of the Energy Policy and Conservation Act (Act) (Pub. L. 94-163). Clothes dryer test procedures were proposed by notice issued April 21, 1977 (42 FR 21589, April 27, 1977), which solicited oral and written comments from interested persons, and a public hearing on the proposed test procedures was held on June 13, 1977. The definitions of "electric clothes dryer" and "gas clothes dryer" were proposed at 41 FR 19980, May 14, 1976.

By notice issued May 24, 1977 (42 FR 27896, June 1, 1977), FEA established Subparts A and B of Part 430, Chapter II of Title 10, Code of Federal Regulations. Certain definitions and general provisions applicable to the energy conservation program for appliances have been promulgated in Subpart A. Final test procedures for room air conditioners and dishwashers have been prescribed in Subpart B. In addition to the test procedures for clothes dryers prescribed today, the final test procedures for television sets, electric refrigerators, electric refrigerator-freezers, and freezers are also being prescribed by separate notices. Several other test procedures have been proposed for inclusion in Subpart B. FEA has also proposed a Subpart C for appliance energy efficiency improvement targets. An outline of the provisions of Part 430 which have so far been established, including provisions in today's notices, is as follows:

SUBPART A—GENERAL PROVISIONS

Sec.
430.1 Purpose and Scope.
430.2 Definitions.

SUBPART B—TEST PROCEDURES

430.21 Purpose and Scope.
430.22 Test Procedures for Measures of Energy Consumption:
(a) Refrigerators and refrigerator-freezers.
(b) Freezers.
(c) Dishwashers.
(d) Clothes dryers.
* * * * *
(f) Room air conditioners.
* * * * *
(h) Television sets.
430.23 Units to be tested [Reserved].
430.24 Representations Regarding Measures of Energy Consumption.
(a) Refrigerators and Refrigerator-freezers.
(b) Freezers.
(c) Dishwashers.
(d) Clothes dryers.
* * * * *
(f) Room air conditioners.
* * * * *
(h) Television sets.

APPENDICES TO SUBPART B

APPENDIX A1—Uniform Test Method for Measuring Energy Consumption of Electric Refrigerators and Electric Refrigerator-freezers.

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APPENDIX B—Uniform Test Method for Measuring the Energy Consumption of Freezers.

APPENDIX C—Uniform Test Method for Measuring the Energy Consumption of Dishwashers.

APPENDIX D—Uniform Test Method for Measuring the Energy Consumption of Clothes Dryers.

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APPENDIX F—Uniform Test Method for Measuring the Energy Consumption of Room Air Conditioners.

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APPENDIX H—Uniform Test Method for Measuring the Energy Consumption of Television Sets.

B. DISCUSSION OF COMMENTS

Comments were received from industry, consumers, and a federal agency. Most of the comments were directed toward technical areas of the proposed test procedures, although some of the comments were specifically directed toward the information that was to be placed on the label. The comments which were directly concerned with the content of the label were more applicable to the labeling program under section 324 of the Act, rather than to the prescription of final test procedures, and were therefore forwarded to the Federal Trade Commission for consideration in developing labeling rules applicable to clothes dryers. The major issues raised by the comments on the proposed test procedures are discussed below.

1. BASIC MODEL DEFINITION

One manufacturer commented on the proposed definition for the "basic model" of clothes dryers in § 430.2 and suggested that the definition be broadened to provide that all similar models which consume an equivalent amount of energy when tested according to the proposed test procedures constitute the same basic model. In particular, it was recommended that the definition incorporate the idea that "styling differences, convenience features, components and functions which do not alter energy usage, do not constitute additional 'basic models' and require testing thereof."

In response to this comment FEA has modified the proposed definition for the "basic model" of clothes dryers to clarify that a single basic model includes units with any variety of different physical or

functional characteristics if these characteristics do not have any effect on the energy consumption of the particular clothes dryer model being tested. For example, these characteristics may include automatic termination systems, drum lights, features which provide for an extended tumble after cooldown, thermostats, cooldown variations, and end-of-cycle signals—if the existence of these features does not affect the energy consumption of the clothes dryer as measured by the prescribed test procedures.

The manufacturer also suggested that units with console lights or other lighting systems that do not consume more than 10 watt-hours of energy during the test cycle should not constitute additional basic models. FEA has responded to this suggestion by revising the installation instructions for the test procedures in 2.1 of Appendix D to permit the manufacturer before testing the clothes dryer to disconnect all console lights or other lighting systems which do not consume more than 10 watts during the clothes dryer test cycle.

2. TEST LOAD

One comment proposed altering the test procedures to provide that two test cycles be conducted on each unit tested using two different loads one consisting entirely of cotton energy test cloths and the other consisting of synthetic energy test cloths. The proposed test procedures required that one test cycle be conducted using a test load of energy test cloths that were a mixture of 50 percent cotton and 50 percent polyester. The commenter felt, however, that this mixture would not produce results that would be representative of actual clothes drying time by consumers. This conclusion was based on the commenter's opinion that most consumers dry synthetics and cotton clothes separately. Therefore, since synthetic material dries more rapidly than cotton due to its low moisture holding ability, the 50–50 test load material as proposed would probably require a longer time to dry due to the presence of the cotton and, therefore, unrealistic differences in the energy measurements between units might occur.

No consumer usage data was provided, however, to support the proposition that most families dry their synthetic clothes separately from their cotton clothes. A Proctor and Gamble field survey conducted for clothes washers provides 1972 consumer usage data which indicates that the composition of wash loads by type of fabric was: 60 percent plain cotton; 20 pecent cotton/synthetic; and 20 percent synthetics. Also, at a public hearing held by FEA in Washington, D.C., on June 2, 1976, concerning the proposed appliance energy efficiency improvement targets for clothes washers, General Electric Company estimated that in an average washer load the ratio of natural fiber to synthetic fiber was approximately 50 percent. Based on these factors and NBS' recommendation, FEA has decided to use a test cloth made of a blend of equal portions of synthetic and cotton material as the appropriate test load. This choice also reflects the trend toward the use of an increasing amount of synthetic materials in a typical consumer wash load and, therefore, is more representative of the type of materials being dried by consumers in a normal dryer load.

The industry and other interested persons are encouraged, however, to provide any additional reliable data as it becomes available concerning consumer clothes drying patterns which would indicate the type and composition of materials actually being dried in a normal load. This data would be considered by FEA in deciding whether or not to alter the present composition of the test cloth material used as the test load.

Another comment with respect to the use of energy test cloths as the test load suggested that the test procedures limit the use of the same energy test cloths to a maximum of 25 test cycles, since the composition of the cloth begins to change after this point and resultant changes in clothes dryer's energy consumption could occur. NBS agrees that this proposed change would reduce potential variability in the test results that may occur from any change in the cotton/polyester composition of the test cloth material caused by the loss of cotton fibers due to continued drying of the same test cloth. Therefore, NBS recommends and FEA concurs that 2.6.1 and 2.6.2 of Appendix D be modified to limit the number of test runs with the same energy test cloth and energy stuffer cloths to 25 runs.

3. FIELD USE FACTOR

Several comments questioned the use of 1.2 for the field use factor as the appropriate multiplier to provide laboratory test results that are representative of actual consumer usage. The comments suggested that this figure should be closer to 1.1. After the comments were received, FEA, in conjunction with NBS, re-evaluated the use of 1.2 as the proper multiplying factor.

A survey conducted by Oklahoma Gas and Electric Company of 64 homes demonstrated that in drying 33,000 loads of clothes, an average of 2.5 kilowatt-hours (kWh's) of electricity was used per cycle. Association of Home Appliance Manufacturers (AHAM) reported data that represented the energy consumption in 1972 of 2,983,200 production units of clothes dryers, consisting of approximately 93 percent standard-size electric dryers and 7 percent compact-size electric dryers, as 5,736,900 kWh's of electricity for one cycle of each unit. This energy consumption was determined by conducting tests in accordance with the procedures described in AHAM's standard HLD–1 and HLD–2EC. Based on this 1972 baseline data, the per-cycle clothes dryer energy consumption for a test conducted pursuant to HLD–2EC which requires a 60 percent reduction in the moisture content of the test load (65 percent to 5 percent) is 1.923 kWh per cycle (5,736,900 KWh's per-cycle divided by 2,983,000 units). Since the reduction in the moisture content of the test load required in the proposed test procedures for clothes dryers is 66 percent (70 percent to 4 percent), the proposed test procedures will result in 10 percent more moisture reduction and therefore 10 percent more energy consumption than the test specified in HLD–2EC.

Therefore, the energy consumed per cycle, 1.923 kWh, by the 1972 production units must be corrected by a factor of 10 percent to arrive at an equivalent per-cycle energy consumption figure that would have resulted had FEA proposed test procedures been used to test the 1972 units. This figure would be 2.12 (1.10 x 1.923 kWh) or 10 percent greater than the figure achieved by the use of the test procedures in HLD–2EC.

The field use factor prescribed in the final test procedures for clothes dryers was derived by dividing the 2.5 kWh per cycle from the Oklahoma Gas and Electric Survey by 2.12 kWh per cycle, which is the adjusted energy consumption to reflect use of the proposed test procedures and a 66 percent reduction in the moisture content of the test load. The resultant field use factor is 1.18. NBS has determined that this value, 1.18, is more accurate than the 1.2 originally proposed and determined on the basis of limited NBS testing, since the 1.18 multiplying factor is derived from data that is production weighted.

Based on NBS's recommendation, FEA has concluded that a field usage factor of 1.18 would more accurately account for any differences between the values derived from the laboratory test procedures and those obtained from actual consumer use. Accordingly, the definition of the field use factor, FU, stated in 4.1 of Appendix D has been changed to 1.18.

4. CLOTHES DRYER CATEGORIES

The majority of the comments recommended that the test procedures provide for four categories of clothes dryers rather than the two categories, standard and compact, as originally proposed. The reason proffered for the further categorization of clothes dryers is to better assist the consumer when purchasing a particular size dryer for particular needs.

Presently, standard clothes dryers include those with drum capacities of 4.4 cubic feet or greater and compact clothes dryers consist of those with drum capacities of less than 4.4 cubic feet. The comments suggested that both of these two categories be further subdivided thereby creating four categories to be determined according to the following drum capacity measurements: 0–3.0 cu. ft., 3.0–4.4 cu. ft., 4.4–6.1 cu. ft., and greater than 6.1 cu. ft. Even with the further categorization, the comments still recommended that the same test loads be used: 3.0 pounds for those clothes dryers with less than a 4.4 cu. ft. drum capacity and 7.0 pounds for those clothes dryers with a 4.4 cu. ft. or greater drum capacity.

One manufacturer, however, fully supported FEA's choice of two clothes dryer categories as being representative of the reality that exists in the market-

place today. This manufacturer also felt that since the test procedures are intended to provide results that are representative of average use conditions, further categorization could confuse and possibly mislead the public.

After consultation with NBS and FTC, FEA has determined that further categorization would not provide a more representative or accurate test procedure for measuring the energy consumption of different size clothes dryers. Therefore, the final test procedures retain the two categories for clothes dryers, standard and compact, as originally proposed.

5. ENERGY FACTOR

Several comments suggested that the energy factor as proposed be changed in order to maintain consistency with the industry practice of defining clothes dryer efficiency as pounds of water removed per kilowatt-hour.

The proposed energy factor for clothes dryers in § 430.22(d)(2) is an additional measure of energy consumption which will be useful to the consumer in making purchasing decisions. Based on NBS' recommendation, FEA has expressed the energy factor in terms of number of pounds of clothes in the test load per kilowatt-hour consumed by the clothes dryer, rather than the amount of water removed per kilowatt-hour. FEA believes that an energy factor determined in this manner will be more meaningful to consumers and easier to relate to than pounds of water removed during a drying cycle and, therefore, is more likely to assist the consumer in making purchasing decisions. The language of § 430.22(d)(2) has been revised accordingly.

6. CONTINUOUSLY BURNING PILOT LIGHT

One manufacturer commented that the calculations provided in the proposed test procedures for determining the estimated annual operating cost for gas clothes dryers in § 430.22(d)(1)(ii) double counts the amount of energy consumed by the continuously burning pilot light while the clothes dryer is in operation.

The total amount of energy consumed by a gas clothes dryer per year is equal to the amount of energy consumed by the dryer during its operation during a year (which includes the energy consumed by the continuously burning pilot light) plus the energy consumed by the pilot light for rest of the time during the year that the dryer is not in operation. NBS conducted a series of tests according to the proposed test procedures using a standard size gas clothes dryer with a 7 pound bone-dry test load. The test resulted in drying times between 15 and 20 minutes to achieve the required 66 percent reduction in the moisture content. Therefore, during the representative average use cycle of 416 cycles per year the clothes dryer operates 138.6 hours (20 minutes per cycle/60 min. per hour times 416 cycles per year) or approximately 140 hours per year. Since the continuously burning pilot light is on year round and there are 8,760 hours in a year, the pilot light burns for 8,620 hours per year (8,760 (hours minus 140 hours) while the clothes dryer is not in operation. FEA has, accordingly, changed 4.4 of Appendix D to use the more accurate figure of 8.620 hours for determining the per-cycle energy consumption of the continuously burning pilot light in order to prevent a double counting of the energy consumed by the pilot light during the operation of the clothes dryer.

Several comments also addressed the 2 percent tolerance in the hourly Btu rating of the gas burner specified in 2.3.2.1 and 2.3.2.2 as being too restrictive. NBS has determined that a 5 percent tolerance on the hourly Btu rating of the burner will have only a minimal effect on the accuracy of the test measurements for clothes dryers and will make the test procedures less burdensome on the industry to conduct. Based on NBS' recommendation, FEA has changed 2.3.2.1 and 2.3.2.2 of Appendix D to permit a tolerance of 5 percent in the hourly Btu rating of the gas burner.

7. ELECTRICAL SUPPLY VOLTAGE

A number of comments questioned the use of the nameplate voltage as the electrical supply voltage required by the test procedures to be maintained during the testing of all clothes dryers. These comments suggested that a specific test voltage be indicated, and that since dryers are designed for three electrical systems, depending upon the dryer's particular terminal block wiring, the test voltage specified should be the same for all clothes dryers in the same voltage category.

FEA agrees with the NBS recommendation to adopt this change, since stating a specific test voltage rather than requiring the manufacturer to conduct the test at the stated nameplate voltage would reduce the variability of measurements between manufacturers. 2.3.1 of Appendix D has been changed accordingly.

8. NUMBER OF TEST RUNS ON EACH UNIT

In order to reduce variability in the test results, one manufacturer felt that five cycles or runs should be conducted on each unit and the results averaged to arrive at a single energy consumption figure for each individual unit. FEA is interested in obtaining test results that are representative of the majority of the individual units that make up each basic model. This can be more easily achieved by testing more units of the same basic model rather than conducting repeated tests on the same unit.

Therefore, FEA has determined that requiring five tests on each unit would be unnecessarily burdensome on the industry in relation to the potential reduction in variability of the test results that may be achieved. Accordingly, no change has been made in the final test procedures in response to this suggestion.

9. RELATIVE HUMIDITY

It was suggested that the tolerance of 45 percent to 55 percent relative humidity required by the proposed test procedures for the relative humidity of the test room was too stringent and should be relaxed to permit a range of 40 percent to 60 percent relative humidity. Some manufacturers stated that special test rooms would have to be built in order to control the relative humidity within the proposed levels.

NBS conducted tests on clothes dryers at the suggested tolerance of 40 percent to 60 percent relative humidity and found that there was an insignificant variation in the test results while also maintaining an ambient room air temperature of 72° to 78° F, as required by the test procedures. In light of the NBS test results and based on NBS' recommendation FEA has modified 2.2 of Appendix D to permit a range of 40 percent to 60 percent relative humidity in the room during the test. This will make the test less burdensome on the industry to conduct without having any significant affect on the accuracy of the test measurements.

10. ENERGY SAVING FEATURES

In the proposed test procedures for clothes dryers the test cycle is run with the clothes dryer being operated at the maximum temperature setting and the maximum time setting, where applicable, until the wet test load is dried to a specified level of moisture content. No specific provision is made in the test procedures to distinguish the testing of clothes dryers with automatic sensing control systems activated by temperature or moisture, as opposed to dryers that are time controlled by the user.

One manufacturer commented that clothes dryer features or options which would save energy, such as temperature sensing and moisture sensing control systems, should be credited by the test procedures. The commenter did provide some frequency of use data based on limited testing of these automatic control systems versus time control systems when both existed on the same model, which indicated that the moisture sensing and temperature sensing features may be used more frequently if they were available on a particular model. The commenter, however, did not supply—and FEA does not have available at this time—any data based on actual testing, or otherwise, that would indicate an actual energy savings from the use of these automatic control systems. FEA agrees with the NBS recommendation that until such time as complete and reliable consumer usuage and energy savings data are available for these automatic sensing control systems, the final test procedures for clothes dryers should not make allowance for these features.

FEA agrees with NBS, however, that the final test procedures prescribed today will produce test results from which an accurate and representative estimated annual cost can be calculated.

The industry and other interested persons are encouraged to provide any reliable data to FEA as it becomes available concerning any actual energy savings design features or options on clothes dryers and the consumer usage of these fea-

tures. This data would be considered by FEA in deciding whether or not an energy credit for these features should be incorporated into the test procedures.

Also with respect to energy consumption or energy savings features, the Office of Consumer Affairs for the Department of Health, Education and Welfare (HEW), suggested that all energy inputs used by a clothes dryer to perform its function should be considered when evaluating the amount of energy consumed by that appliance. Specifically HEW felt that it was necessary to consider the loss of the heated or cooled air which is used by the dryer during its normal operation and the resultant energy cost to re-heat or re-cool the replacement air.

HEW also commented on and one consumer provided some data on the total energy savings to the consumer that could occur from the use of devices on clothes dryers such as exhaust diverters which attempt to save the heat generated by the clothes dryer in the winter by venting the exhaust of the clothes dryer back into the interior of the home. HEW suggested that the amount of energy that could be saved and the resultant dollar savings to the consumer by the use of a device such as an exhaust diverter should be placed on the label.

Clothes dryers are generally placed inside the home and utilize the interior air for drying clothes by drawing it into the clothes dryer and then exhausting it through a vent to the outside of the home. Therefore, a potentially significant quantity of the internal pre-conditioned air in the home is lost to the outdoors by the normal operation of a clothes dryer and replacement air must then be heated or cooled. Thus, the energy consumed by a clothes dryer consists, in part, of the amount of additional energy needed to maintain the desired ambient air temperature in the home.

In providing for the determination of the estimated annual operating cost for clothes dryers, the final test procedures do not account for the added energy costs to the heating or cooling units in the home to recondition the air lost during the operation of the clothes dryer. The final test procedures also do not provide a method for crediting any potential energy savings that could be achieved from design changes on clothes dryers that would avoid or diminish those added energy costs by altering the normal intake and exhaust venting arrangements of a clothes dryer.

While the test procedures prescribed today are final, FEA believes that the added energy losses caused by the normal clothes dryer exhaust system and the potential energy savings to be achieved from certain venting design options merit further study. FEA has therefore directed NBS to evaluate and study this problem and to provide FEA with reliable data on the amount and significance of any energy and cost savings that could be achieved by the different types of clothes dryers used in the home in conjunction with different heating and cooling units, and to what extent today's prescribed test procedures would have to be changed to account for these potential energy losses and energy savings. NBS has also been requested to evaluate any burden on the industry that would be caused by a modification of these test procedures. If after review of the NBS study FEA determines that the issue merits further consideration, FEA will publish the NBS study in the FEDERAL REGISTER and afford interested persons an opportunity to comment. In no event will the final test procedures for clothes dryers prescribed today be amended with respect to this issue without providing interested persons an opportunity to present oral and written data, views, and arguments.

11. NUMBER OF UNITS TO BE TESTED

Proposed § 430.23(d) provided for sampling of each basic model to be tested when testing of clothes dryers is required by the Act or by program regulations of agencies responsible for administering the Act. This provision was intended both to provide an acceptable level of assurance that test results are applicable to any entire basic model for which testing is required and to minimize the testing burden on manufacturers.

The comments expressed some objections to the sampling provision for clothes dryers similar in substance to the objections raised to the sampling plan proposed for room air conditioners by notices issued July 22, 1976 (41 FR 31237, July 27, 1976) and March 24, 1977 (42 FR 16811, March 30, 1977). One manufacturer also requested that some provision in the test procedures be same for a resampling within a short period of time if the mean of the selected sample does not fall within the specified limits.

Test procedures prescribed under section 323 of the Act are intended to be used, for example, for labeling under section 324, in monitoring the progress of manufacturers toward accomplishing the energy efficiency improvement targets under section 325, and in enforcement testing under section 326. These aspects of the appliance program have not, however, been implemented. It is quite possible that the objectives of appliance testing under each of these parts of the program, as well as the instructions on how a test procedure should be applied (e.g., sampling of production units), may differ. FEA, NBS, and FTC are continuing to evaluate the appropriate method or methods for applying the test procedures in order to comply with the statute and satisfy all of the different elements of the appliance program.

While the various parts of the appliance program identified above are not in effect at this time, section 323(c) of the Act provides:

> Effective 90 days after a test procedure rule applicable to a covered product is prescribed under this section, no manufacturer, distributor, retailer or private labeler may make any representation—
>
> (1) In writing (including a representation on a label), or
>
> (2) In any broadcast advertisement, respecting the energy consumption of such product or cost of energy consumed by such product, unless such product has been tested in accordance with such test procedure and such representation fairly discloses the results of such testing.

In order to eliminate the problems discussed above associated with a general sampling provision, proposed § 430.23(d) has been limited in the final test procedures to testing which section 323(c) of the Act requires regarding the advertising of clothes dryers. The sampling requirements which apply only for purposes of advertising have been reorganized into § 430.24(d) of the final test procedures. Section 430.24(d) is similar to proposed § 430.23(d), but with several revisions. Most notably, the units tested are required to be representative of production units or actual production units. This change is intended to reduce the burden which might be caused by requiring post-production rating of basic models in every instance of testing pursuant to section 323(c) of the Act.

In addition, certain technical changes have been made in the sampling language. Specifically, there is to be 95 percent confidence that the true mean of any measure of the basic model lies within 5 percent of the mean of such measure of the sample. Comments pertaining to several proposed test procedures, including clothes dryers, criticized the language of the proposed sampling provisions. These comments suggested that a sampling provision should refer to the estimate of the mean rather than to the true mean. FEA has considered this suggestion and has determined that the language prescribed today is more technically correct because the statistical measures "estimate of the mean" and "mean of the sample" are generally considered to be identical. The test procedures for room air conditioners and dishwashers used both these terms in a manner that could be confusing, and the language prescribed today is intended to eliminate this potential confusion.

Until a labeling rule has been implemented pursuant to section 324, manufacturers are not required to test unless they choose to make a representation regarding a measure of energy consumption identified in or based upon § 430.22 (d). It should also be emphasized that the test procedures prescribed today apply only to the initial rating of a basic model.

12. MISCELLANEOUS

After careful consideration of all of the comments and further consultation with NBS and FTC, FEA has incorporated some minor editorial and technical changes in the proposed test procedures in the final rule that were not discussed above.

C. REGULATIONS PRESCRIBED

1. TEST PROCEDURES

The test procedures for clothes dryers prescribed today are included in Subpart B and are substantially the same as those proposed, with the exception of the changes discussed above. As with the proposed procedures, the test methodology incorporates the approach contained in the Association of Home Appliance

Manufacturers (AHAM) Standard HLD-2EC for measuring the energy consumption clothes dryers. For purposes of FEA's program, the incorporated approach remains applicable as presently written, regardless of any subsequent amendment by the standard setting organization, until further amendment by FEA.

Under the requirements of section 32 (c) of the Federal Energy Administration Act of 1974 (15 U.S.C. 761 et seq.) as amended by section 9 of the Federal Energy Administration Authorization Act of 1977 (Pub. L. 95-70), the Administrator of FEA is to consult with the Attorney General and the Chairman of the Federal Trade Commission concerning the impact on competition of any rules prescribed by FEA which utilize or incorporate any commercial standards.

The Administrator has transmitted copies of the test procedures for clothes dryers, which incorporate the above mentioned commercial standards, to the Attorney General and the Chairman of the Federal Trade Commission for their comments concerning the impact of such standards on competition in accordance with section 32(c). Neither official has any comments nor do they recommend against the incorporation or use of these commercial standards in the final test procedures for clothes dryers.

2. GENERAL PROVISIONS

Prescribed today are definitions of "electric clothes dryer" and "gas clothes dryer." These definitions were previously proposed in Subpart A (41 FR 19977, May 14, 1976). The definition of the term "basic model" for clothes dryers prescribed today as substantially the same as the definition previously proposed in Subpart A (42 FR 21589, April 27, 1977). Comments which were received regarding the definition of "basic model" have been discussed earlier in this notice.

3. APPLICATION OF TEST PROCEDURES

As discussed previously, the final clothes dryer test procedures prescribed today must be applied before representations regarding a measure of energy consumption can be made. Because the purposes and needs of the different elements of the appliance program (e.g., labeling, targets) vary, application of the standard test methodology prescribed today may differ in some respects for each program element. It is expected that instructions on how to apply the standard test methodology to these other elements of the appliance program will be proposed for comment in the near future.

The requirements of § 430.24(d) of the final regulations apply until such time as final labeling requirements for a particular measure of energy consumption and the associated test procedures' application provision are prescribed. After that time, any representation regarding a measure of energy consumption covered by a labeling rule must be the same as the measure of energy consumption specified on the label.

D. UNIT COSTS OF ENERGY

Under section 323(b)(2) of the Act, FEA is to provide manufacturers information as to the representative average unit costs of energy. This information was provided by notice issued July 11, 1977 (42 FR 36549, July 15, 1977).

E. PREEMPTION

Today's rulemaking prescribing final test procedures for clothes dryers supersedes any State regulation to the extent required by section 327 of the Act. Pursuant to section 327, all State regulations which provide for the disclosure of information with respect to any measure of energy consumption of clothes dryers or which provide for any energy efficiency standard or similar requirement with respect to energy efficiency or energy use of clothes dryers must now employ test procedures identical to those specified in today's final rule.

(Energy Policy and Conservation Act, Pub. L. 94-163, as amended by Pub. L. 94-385; Federal Energy Administration Act of 1974, Pub. L. 93-275, as amended by Pub. L. 94-385; E.O. 11790, 39 FR 23185)

In consideration of the foregoing, Part 430 of Chapter II of Title 10, Code of Federal Regulations, is amended as set forth below, effective October 17, 1977.

Issued in Washington, D.C., September 8, 1977.

ERIC J. FYGI,
Acting General Counsel,
Federal Energy Administration.

1. Section 430.2 is amended by adding paragraph (4) as part of the definition of "basic model," and by adding in the appropriate alphabetical order definitions of "electric clothes dryer" and "gas clothes dryer" to read as follows:

§ 430.2 Definitions.

* * * * *

"Basic model" means all units of a given type of covered product (or class thereof) manufactured by one manufacturer and—

* * * * *

(4) With respect to clothes dryers, which have the same primary energy source, which have electrical characteristics that are essentially identical, and which do not have any differing physical or functional characteristics that affect energy consumption.

* * * * *

"Electric clothes dryer" means a cabinet-like appliance designed to dry fabrics in a tumble-type drum with forced air circulation. The heat source is electricity and the drum and blower(s) are driven by an electric motor(s).

* * * * *

"Gas clothes dryer" means a cabinet-like appliance designed to dry fabrics in a tumble-type drum with forced air circulation. The heat source is gas and the drum and blower(s) are driven by an electric motor(s).

* * * * *

2. Section 430.22 is amended by adding a paragraph (d), to read as follows:

§ 430.22 Test procedures for measures of energy consumption.

* * * * *

(d) *Clothes dryers.* (1) The estimated annual operating cost for clothes dryers shall be—

(i) For an electric clothes dryer, the product of the following three factors: (A) The representative average-use cycle of 416 cycles per year, (B) the total per-cycle energy consumption in kilowatt-hours per-cycle, determined according to 4.1 of Appendix D to this subpart, and (C) the representative average unit cost in dollars per kilowatt-hour as provided by the Administrator, the resulting product then being rounded off to the nearest dollar per year, and

(ii) For a gas clothes dryer, the product of the representative average-use cycle of 416 cycles per year times the sum of (A) the product of the gas dryer electric per-cycle energy consumption in kilowatt-hours per cycle, determined according to 4.2 of Appendix D to this subpart, times the representative average unit cost in dollars per kilowatt-hour as provided by the Administrator plus (B) the product of the total gas dryer gas energy consumption per cycle, in Btu's per cycle, determined according to 4.5 of Appendix D of this subpart, times the representative average unit cost in dollars per Btu as provided by the Administrator, the resulting product then being rounded off to the nearest dollar per year.

(2) The energy factor, expressed in pounds of clothes per kilowatt-hour, for clothes dryers shall be either the quotient of a 3-pound bone-dry test load for compact dryers, as defined by 2.6.1 of Appendix D to this subpart or the quotient of a 7 pound bone-dry test load for standard dryers, as defined by 2.6.2 of Appendix D to this subpart, as applicable, divided by the clothes dryer energy consumption per cycle, as determined according to 4.1 for electric clothes dryers and 4.6 for gas clothes dryers of Appendix D to this subpart, the resulting quotient then being rounded off to the nearest hundredth (.01).

(3) Other useful measures of energy consumption for clothes dryers shall be those measures of energy consumption for clothes dryers which the Administrator determines are likely to assist consumers in making purchasing decisions and which are derived from the application of Appendix D to this subpart.

* * * * *

3. Section 430.24 is amended by adding a paragraph (d), to read as follows:

§ 430.24 Representations regarding measures of energy consumption.

* * * * *

(d) *Clothes dryers.* (1) Except as provided in paragraph (d)(4) of this section, no manufacturer, distributor, retailer, or private labeler of clothes dryers may make any representation with re-

spect to or based upon a measure or measures of energy consumption described in § 430.22(d) unless a sample of sufficient size of each basic model for which such representation is made has been tested in accordance with applicable provisions of this subpart such that, for each such measure of energy consumption, there is 95 percent confidence that the true mean of such measures of the basic model lies within ±5 percent of the mean of such measures of the sample.

(2) The sample selected for paragraph (d)(1) of this section shall be comprised of units which are production units, or are representative of production units, of the basic model being tested.

(3) A basic model having dual voltage ratings shall be separately tested at each design voltage such that the requirements of paragraph (d)(1) of this section are satisfied at each rating.

(4) Whenever a rule applicable to clothes dryers is prescribed under section 324 of the Act, this paragraph shall not apply to any label covered by such rule, and all representations of any measure of energy consumption covered by su h rule shall be identical to the measure of energy consumption on the label.

4. Subpart B of Part 430 is amended to add an Appendix D, to read as follows:

APPENDIX D—UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF CLOTHES DRYERS

1 DEFINITIONS

1.1 "AHAM" means the Association of Home Appliance Manufacturers.

1.2 "Bone-dry" means a condition of a load of test cloth which has been dried in a dryer at maximum temperature for a minimum of 10 minutes, removed and weighed before cool down, and then dried again for 10 minute periods until the final weight change of the load is 1 percent or less.

1.3 "Compact" means a clothes dryer with a drum capacity of less than 4.4 cubic feet.

1.4 "Cool down" means that portion of the clothes drying cycle when the added gas or electric heat is terminated and the clothes continue to tumble and dry within the drum.

1.5 "Cycle" means a sequence of operation of a clothes dryer which performs a clothes drying operation, and may include variations or combinations of the functions of heating, tumbling and drying.

1.6 "Drum capacity" means the volume of the drying drum in cubic feet.

1.7 "HLD–1" means the test standard promulgated by AHAM and titled "AHAM Performance Evaluation Procedure for Household Tumble Type Clothes Dryers", June, 1974, and designated as HLD–1.

1.8 "HLD–2EC" means the test standard promulgated by AHAM and titled "Test Method for Measuring Energy Consumption of Household Tumble Type Clothes Dryers," December. 1975. and designated as HLD–2EC.

1.9 "Standard size" means a clothes dryer with a drum capacity of 4.4 cubic feet or greater.

1.10 "Moisture content" means the ratio of the weight of water contained by the test load to the bone-dry weight of the test load, expressed as a percent.

2. TESTING CONDITIONS

2.1 *Installation.* Install the clothes dryer in accordance with manufacturer's instructions. The dryer exhaust shall be restricted by adding the AHAM exhaust simulator described in 3.3.5 of HLD–1. All external joints should be taped to avoid air leakage. Disconnect all console lights or other lighting systems on the clothes dryer which do not consume more than 10 watts during the clothes dryer test cycle.

2.2 *Ambient temperature and humidity.* Maintain the room ambient air temperature between 72°F and 78°F and the room relative humidity at 40 percent to 60 percent relative humidity.

2.3 *Energy supply.*

2.3.1 *Electrical supply.* Maintain the electrical supply at the clothes dryer terminal block within 1 percent of 120/240 or 120/208Y or 120 volts as applicable to the particular terminal block wiring system and within 1 percent of the nameplate frequency as specified by the manufacturer.

2.3.2 *Gas supply.*

2.3.2.1 *Natural gas.* Maintain the gas supply to the clothes dryer at a normal inlet test pressure immediately ahead of all controls at 7 to 10 inches of water column. If the clothes dryer is equipped with a gas appliance pressure regulator, the regulator outlet pressure at the normal test pressure shall be approximately that recommended by the manufacturer. The hourly Btu rating of the burner shall be maintained within ±5 percent of the rating specified by the manufacturer. The natural gas supplied should have a heating value of approximately 1,025 Btu's per standard cubic foot. The actual heating value, H_n, in Btu's per standard cubic foot, for the natural gas to be used in the test shall be obtained either from measurements made by the manufacturer conducting the test using a standard continuous flow calorimeter as described in 2.4.6 or by the purchase of bottled natural gas whose Btu rating is certified to be at least as accurate a rating as could be obtained from measurements with a standard continuous flow calorimeter as described in 2.4.6.

2.3.2.2 *Propane gas.* Maintain the gas supply to the clothes dryer at a normal inlet test pressure immediately ahead of all controls at 11 to 13 inches of water column. If the clothes dryer is equipped with a gas appliance pressure regulator, the regulator outlet pressure at the normal test pressure shall be approximately that recommended by the manufacturer. The hourly Btu rating of the burner shall be maintained within ±5 percent of the rating specified by the manufacturer. The propane gas supplied should have a heating value of approximately 2,500 Btu's per standard cubic foot. The actual heating value, H_p, in Btu's per standard cubic foot, for the propane gas to be used in the test shall be obtained either from measurements made by the manufacturer conducting the test using a standard continuous flow calorimeter as described in 2.4.6 or by the purchase of bottled gas whose Btu rating is certified to be at least as accurate a rating as could be obtained from measurements with a standard continuous calorimeter as described in 2.4.6.

2.4 *Instrumentation.* Perform all test measurements using the following instruments, as appropriate:

2.4.1 *Weighing scales.*

2.4.1 *Weighing scale for test cloth.* The scale shall have a range of 0 to a maximum of 30 pounds with a resolution of at least 0.2 ounces and a maximum error no greater than 0.3 percent of any measured value within the range of 3 to 15 pounds.

2.4.1.2 *Weighting scale for drum capacity measurements.* The scale should have a range of 0 to a maximum of 500 pounds with a resolution of 0.50 pounds and a maximum error no greater than 0.5 percent of the measured value.

2.4.2 *Kilowatt-hour meter.* The kilowatt-hour meter shall have a resolution of 0.001 kilowatt-hours and a maximum error no greater than 0.5 percent of the measured value for any demand greater than 0.16 kilowatt-hours per hour.

2.4.3 *Gas meter.* The gas meter shall have a resolution of 0.001 cubic feet and a maximum error no greater than 0.5 percent of the measured value for any demand greater than 0.2 cubic feet per hour.

2.4.4 *Dry and wet bulb psychrometer.* The dry and wet bulb psychrometer shall have an error no greater than ±1° F over the range of 32° to 100° F.

2.4.5 *Thermometer.* The thermometer shall have an error no greater than ±1° F over the range of 32° to 100° F.

2.4.6 *Standard Continuous Flow Calorimeter.* The calorimeter shall have an operating range of 750 to 3,500 Btu per cubic feet. The maximum error of the basic calorimeter shall be no greater than 0.2 percent of the actual heating value of the gas used in the test. The indicator readout shall have a maximum error no greater than 0.5 percent of the measured value within the operating range and a resolution of 0.2 percent of the full scale reading of the indicator instrument.

2.5 *Lint trap.* Clean the lint trap thoroughly before each test run.

2.6 *Test cloths.*

2.6.1 *Energy test cloth.* The energy test cloth shall be clean and consist of the following:

(a) Pure finished bleached cloth, made with a momie or granite weave, which is 50 percent cotton and 50 percent polyester and weighs 5.75 ounces per square yard and has 65 ends on the warp and 57 picks on the fill.

(b) Cloth material that is 24 inches by 36 inches and has been hemmed to 22 inches by 34 inches before washing. The maximum shrinkage after five washes shall not be more than four percent on the length and width.

(c) The number of test runs on the same energy test cloth shall not exceed 25 runs.

2.6.2 *Energy stuffer cloths.* The energy stuffer cloths shall be made from energy test cloth material and shall consist of pieces of material that are 12 inches by 12 inches and have been hemmed to 10 inches by 10 inches before washing. The maximum shrinkage after five washes shall not be more than four percent on the length and width. The number of test runs on the same energy stuffer cloth shall not exceed 25 runs.

2.7 *Test loads.*

2.7.1 *Compact size dryer load.* Prepare a bone-dry test load of energy cloths which weighs 3.00 pounds + .03 pounds. Adjustments to the test load to achieve the proper weight can be made by the use of energy stuffer cloths. Dampen the load by agitating it in water whose temperature is 100°±5° F and consists of 0 to 17 parts per million hardness for approximately two minutes in order to saturate the fabric. Then, extract water from the wet test load by spinning the load until the moisture content of the load is between 66.5 percent to 73.5 percent of the bone-dry weight of the test load.

2.7.2 *Standard size dryer load.* Prepare a bone-dry test load of energy cloths which weighs 7.00 pounds ± .07 pounds. Adjustments to the test load to achieve the proper weight can be made by the use of energy stuffer cloths. Dampen the load by agitating it in water whose temperature is 100°±5° F and consists of 0 to 17 parts per million hardness for approximately two minutes in order to saturate the fabric. Then, extract water from the wet test load by spinning the load until the moisture content of the load

is between 66.5 percent to 73.5 percent of the bone-dry weight of the test load.

2.7.3 *Method of loading.* Load the energy test cloths by grasping them in the center, shaking them to hang loosely and then dropping them in the dryer at random.

3. TEST PROCEDURES AND MEASUREMENTS

3.1 *Drum capacity.* Measure the drum capacity by sealing all openings in the drum except the loading port with a plastic bag, and ensure that all corners and depressions are filled and that there are no extrusions of the plastic bag through the opening in the drum. Support the dryer's rear drum surface on a platform scale to prevent deflection of the dryer, and record the weight of the empty dryer. Fill the drum with water to a level determined by the intersection of the door plane and the loading port. Record the temperature of the water and then the weight of the dryer with the added water and then determine the mass of the water in pounds. Add or subtract the appropriate volume depending on whether or not the plastic bag protrudes into the drum interior. The drum capacity is calculated as follows:

$$C = \frac{w}{d}$$

C = capacity in cubic feet.
w = mass of water in pounds.
d = density of water at the measured temperature in pounds per cubic feet.

3.2 *Dryer loading.* Load the dryer as specified in 2.6.

3.3 *Test Cycle.* Operate the clothes dryer at the maximum temperature setting and, if equipped with a timer, at the maximum time setting and dry the test load until the moisture content of the test load is between 2.5 percent to 5.0 percent of the bone-dry weight of the test load, but do not permit the dryer to advance into cool down. If required, reset the timer or automatic dry control.

3.4 *Data recording.* Record for each test cycle:

3.4.1 Bone-dry weight of the test load described in 2.6.

3.4.2 Moisture content of the wet test load before the test described in 2.6.

3.4.3 Moisture content of the dry test load obtained after the test described in 3.3.

3.4.4 Test room conditions, temperature and percent relative humidity described in 2.2.

3.4.5 For electric dryers—the total kilowatt-hours of electric energy, E_t, consumed during the test described in 3.3.

3.4.6 For gas dryers:

3.4.6.1 Total kilowatt-hours of electrical energy, E_{te}, consumed during the test described in 3.3.

3.4.6.2 Cubic feet of gas per cycle, E_{tg}, consumed during the test described in 3.3.

3.4.6.3 On gas dryers using a continuously burning pilot light—the cubic feet of gas, E_{pg}, consumed by the gas pilot light in one hour.

3.4.6.4 Correct the gas heating value, GEF, as measured in 2.3.2.1 and 2.3.2.2, to standard pressure and temperature conditions in accordance with U.S. Bureau of Standards, Circular C417, 1938. A sample calculation is illustrated in Appendix E of HLD–1.

4. CALCULATION OF DERIVED RESULTS FROM TEST MEASUREMENTS

4.1 *Total per-cycle electric dryer energy consumption.* Calculate the total electric dryer energy consumption per cycle, E_{ce}, expressed in kilowatt-hours per cycle and defined as:

$$E_{ce} = \frac{66}{(W_w - W_d)} \times E_t \times FU$$

E_t = the energy recorded in 3.4.5
66 = an experimentally established value for the percent reduction in the moisture content of the test load during a laboratory test cycle
FU = Field use factor = 1.18
W_w = the moisture content of the wet test load as recorded in 3.4.2
W_d = the moisture content of the dry test load as recorded in 3.4.3

4.2 *Per-cycle gas dryer electrical energy consumption.* Calculate the gas dryer electrical energy consumption per cycle, E_{se}, expressed in kilowatt-hours per cycle and defined as:

$$E_{se} = \frac{66}{(W_w - W_d)} \times E_{te} \times FU$$

E_{te} = the energy recorded in 3.4.6.1
FU, 66, W_w, W_d as defined in 4.1

4.3 *Per-cycle gas dryer gas energy consumption.* Calculate the gas dryer gas energy consumption per cycle, E_{sg}, expressed in Btu's per cycle as defined as:

$$E_{sg} = \frac{66}{(W_w - W_d)} \times E_{tg} \times FU \times GEF$$

E_{tg} = the energy recorded in 3.4.6.2
GEF = corrected gas heat value (Btu per cubic feet) as defined in 3.4.6.4
FU, 66, W_w, W_d as defined in 4.1

4.4 *Per-cycle gas dryer continuously burning pilot light gas energy consumption.* Calculate the gas dryer continuously burning pilot light gas energy consumption per cycle, E_{sp}, expressed in Btu's per cycle and defined as:

$$E_{sp} = E_{pg} \times \left(\frac{8760 - 140}{416}\right) \times GEF$$

E_{pg} = the energy recorded in 3.4.6.3
8760 = number of hours in a year
416 = representative average number of clothes dryer cycles in a year
140 = estimated number of hours that the continuously burning pilot light is on during the operation of the clothes dryer for the representative average use cycle for clothes dryers (416 cycles per year)
GEF as defined in 4.3

4.5 *Total per-cycle gas dryer gas energy consumption expressed in Btu's.* Calculate the total gas dryer energy consumption per cycle, E_g, expressed in Btu's per cycle and defined as:

$$E_g = E_{sg} + E_{sp}$$

E_{sg} as defined in 4.3
E_{sp} as defined in 4.4

4.6 *Total per-cycle gas dryer energy consumption expressed in kilowatt-hours.* Calculate the total gas dryer energy consumption per cycle, E_{cg}, expressed in kilowatt-hours per cycle and defined as:

$$E_{cg} = E_{se} + \frac{E_g}{3412 \text{ Btu/kWh}}$$

E_{se} as defined in 4.2
E_g as defined in 4.5

[FR Doc.77-26725 Filed 9-13-77;8:45 am]

PART 430—ENERGY CONSERVATION PROGRAM FOR APPLIANCES

Test Procedures for Television Sets

AGENCY: Federal Energy Administration.

ACTION: Final rule.

SUMMARY: This rule prescribes final test procedures for television sets. Appliance test procedures are one element of the appliance energy efficiency program required by the Energy Policy and Conservation Act.

FOR FURTHER INFORMATION CONTACT:

James A. Smith (Program Office), Room 307, Old Post Office Building, 12th and Pennsylvania Avenue NW., Washington, D.C. 20461 (202–566–4635).

Charles E. Vilade (Media Relations), Room 3104, Federal Building, 12th and Pennsylvania Avenue NW., Washington, D.C. 20461 (202–566–9833).

Elliott D. Light (Office of General Counsel), Room 7150, Federal Building, 12th and Pennsylvania Avenue NW., Washington, D.C. 20461 (202–566–9750).

SUPPLEMENTARY INFORMATION:

A. BACKGROUND

The Federal Energy Administration (FEA) hereby amends Part 430, Chapter II of Title 10, Code of Federal Regulations, in order to prescribe test procedures for television sets pursuant to section 323 (42 U.S.C. 6293) of the Energy Policy and Conservation Act (Act) (Pub. L. 94–163). Television receiver test procedures were proposed by notice issued April 21, 1977 (42 FR 21580, April 27, 1977). No requests to make oral presentations concerning the proposed test procedures were filed and, as a result, the public hearing scheduled for June 14 was canceled. The definitions of "color television receiver" and "monochrome television receiver" were proposed at 41 FR 18890, May 14, 1976. The phrase "television receiver" has been changed to "television set" in the final test procedures and the above definitions have been changed in the final test procedures in order to be consistent with the language of section 322(a)(8) of the Act.

By notice issued May 24, 1977 (42 FR 27896, June 1, 1977), FEA established Subparts A and B of Part 430, Chapter II of Title 10, Code of Federal Regulations. Certain definitions and general provisions applicable to the energy conservation program for appliances have been promulgated in Subpart A. Final test procedures for room air conditioners and dishwashers have been prescribed in Suppart B. In addition to the test procedures for television sets prescribed today, the final test procedures for clothes dryers, electric refrigerators, electric refrigerator-freezers, and freezers are also being prescribed by separate notices. Other test procedures have been proposed for inclusion in Subpart B. FEA has also proposed a Subpart C for appliance energy efficiency improvement targets. An outline of the provisions of Part 430 which have so far been established, including provisions in today's notices, is as follows:

SUBPART A—GENERAL PROVISIONS

Sec.
430.1 Purpose and Scope.
430.2 Definitions.

SUBPART B—TEST PROCEDURES

430.21 Purpose and Scope.
430.22 Test Procedures for Measures of Energy Consumption:
(a) Refrigerators and refrigerator-freezers.
(b) Freezers.
(c) Dishwashers.
(d) Clothes dryers.

• • • • •

(f) Room air conditioners.

* * * * *

(h) Television sets.

430.23 Units to be Tested [Reserved].

430.24 Representative Regarding Measures of Energy Consumption

(a) Refrigerators and refrigerator-freezers

(b) Freezers

(c) Dishwashers

(d) Clothes dryers

* * * * *

(f) Room air conditioners

* * * * *

(h) Television sets

APPENDICES TO SUBPART B

Appendix A1—Uniform Test Method for Measuring the Energy Consumption of Electric Refrigerators and Electric Refrigerator-Freezers.

* * * * *

Appendix B—Uniform Test Method for Measuring the Energy Consumption of Freezers.

Appendix C—Uniform Test Method of Measuring the Energy Consumption of Dishwashers.

Appendix D—Uniform Test Method for Measuring the Energy Consumption of Clothes Dryers.

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Appendix F—Uniform Test Method for Measuring the Energy Consumption of Room Air Conditioners.

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Appendix H—Uniform Test Method for Measuring the Energy Consumption of Television Sets.

B. DISCUSSION OF COMMENTS

Only comments from industry were received in response to the request for public comments. All comments were directed toward technical areas of the proposed test procedures. The major issues raised by the comments are discussed below.

1. ENERGY SAVING FEATURES

It was suggested that many units with a remote control have a remote control defeat switch which when used permits the consumer to turn off all standby power to the remote control circuits. It was suggested that television sets which incorporate a remote control defeat switch should receive the same 50 percent credit given to units having a vacation switch and that the credit could be applied by reducing by 50 percent the contribution of remote control circuits to the standby power. FEA agrees that these switches have the potential to save energy and should be classified as energy saving features. For this reason the suggestion has been adopted.

Revisions have also been made to incorporate the 50 percent energy credit for energy saving devices into the estimated annual operating cost. This change obviates the need to distinguish the standard and vacation operating modes for purposes of the estimated annual operating cost. Thus, the estimated annual operating cost for the vacation mode has been deleted from the final regulation.

2. NUMBER OF UNITS TO BE TESTED

One comment was concerned about the requirement that units to be tested come from the production stream. It was felt that this could delay advertising if tests could not be run on preproduction models. While no comments adressed the number of units to be tested or the 5 percent tolerance required on any measure of energy consumption, FEA has reviewed the actual use of test procedures in the context of other covered products. Test procedures prescribed under section 323 of the Act are intended to be used, for example for labeling under section 324, in monitoring of the program of manufacturers toward accomplishing the energy efficiency improvement targets under section 325, and in enforcement testing under section 326. These aspects of the appliance program have not, however, been implemented. It is quite possible that the objectives of appliance testing under each of these parts of the program as well as the instructions as to how a test procedure should be applied (e.g., sampling of production units), may differ. FEA, NBS, and FTC are continuing to evaluate the appropriate method or methods for applying test procedures in order to comply with the statute and satisfy all of the different elements of the appliance program.

While the various parts of the appliance program identified above are not in effect at this time, section 323(c) of the Act provides:

> Effective 90 days after a test procedure rule applicable to a covered product is prescribed under this section, no manufacturer, distributor, retailer, or private labeler may make any representation—
>
> (1) In writing (including a representation on a label) or,
>
> (2) In any broadcast advertisement, respecting the energy consumption of such product or cost of energy consumed by such product, unless such product has been tested in accordance with such test procedure and such representation fairly discloses the results of such testing.

The sampling requirements which apply only for purposes of advertising have been reorganized into § 430.24(h) of the final test procedures. Section 430.24(h) is similar to proposed § 430.23(h) but with several revisions. Most notably, the units tested are required to be representative of production units or actual production units. This change is intended to reduce the burden which might be caused by requiring post-production rating of basic models in every instance of testing pursuant to section 323(c) of the Act.

In addition, certain technical changes have been made in the sampling language. Specifically, there is to be 95 percent confidence that the true mean or any measure of the basic model lies within 5 percent of the mean of such measure of the sample. Comments pertaining to several proposed test procedures criticized the language of the proposed sampling provisions. These comments suggested that a sampling provision should refer to the estimate of the mean rather than to the true mean. FEA has considered this suggestion and has determined that the language prescribed today is more technically correct because the statistical measures "estimate of the mean" and "mean of the sample" are generally considered to be identical. The test procedures for room air conditioners and dishwashers used both these terms in a manner that could be confusing, and the language prescribed today is intended to eliminate this potential confusion.

Until a labeling rule has been implemented pursuant to section 324, manufacturers are not required to test unless they choose to make a representation regarding a measure of energy consumption identified in or based upon § 430.22 (h). It should also be emphasized that the test procedures prescribed today apply only to the initial rating of a basic model.

3. REPRESENTATIVE AVERAGE-USE CYCLE

One comment received stated that the television set in a home entertainment center is not used as many hours as a television set alone. No supporting data to this claim was submitted. The average-use cycle was obtained by using a weighted average of the hours of operation of a television receiver. The number of home entertainment centers sold containing television sets is small when compared to television sets sold alone. Thus, the weighted effect in the representative average-use cycle of any difference in the hours of television set operation included in home entertainment centers is negligible. For these reasons, no changes have been made to the proposed average-use cycle for home entertainment centers.

4. MISCELLANEOUS

After careful consideration of all of the comments and further consultation with NBS and FTC, FEA has incorporated some minor changes in the proposed test procedures in the final rule that were not discussed above.

C. REGULATIONS PRESCRIBED

1. TEST PROCEDURES

The test procedures for television sets prescribed today are included in Subpart B and are substantially the same as those proposed, with the addition of the changes discussed above. As with the proposed procedures, the test methodology incorporates American National Standard C 16.13–1961, Method of Testing Monochrome Television Broadcast Receivers for calculation of available power. Also incorporated into the test methodology are the National Television System Committee composite video signal and the Institute of Radio Engineers unit flat field. For purposes of FEA's program, the incorporated standards remain applicable as presently written, regardless of any subsequent amendment by the standard setting organization, until further amendment by FEA.

Under the requirements of section 32 (c) of the Federal Energy Administra-

tion Act of 1974 (15 U.S.C. 761 et seq.) as amended by section 9 of the Federal Energy Authorization Act of 1977 (Pub. L. 95–70), the Administrator of FEA is to consult with the Attorney General and the Chairman of the Federal Trade Commission concerning the impact on competition of any rules prescribed by FEA which utilize or incorporate any commercial standards.

The Administrator has transmitted copies of the test procedures for television sets, which incorporate the above mentioned commercial standards, to the Attorney General and the Chairman of the Federal Trade Commission for their comments concerning the impact of such standards on competition in accordance with section 32(c). Neither official has any comments nor do they recommend against the incorporation or use of these commercial standards in the final test procedures for television sets.

2. GENERAL PROVISIONS

Also prescribed today are certain definitions for "television set," "color television set," and "monochrome television set." The definitions of color television set and monochrome television set were previously proposed in Subpart A (41 FR 19977, May 14, 1976). (As originally proposed, the word "receiver" was used instead of "sets." The definition of "basic model" for television sets, proposed at 42 FR 21583, has also been added. A definition of "television set" has been added for the purposes of clarification.

3. APPLICATION OF TEST PROCEDURES

As discussed previously, the final test procedures prescribed today must be applied before any representation regarding a measure of energy consumption can be made. Because the purposes and needs of the different elements of the appliance program (e.g., labeling, targets) vary, application of the standard test methodology prescribed today may differ in some respects for each program element. It is expected that instructions on how to apply the standard test methodology to these other elements of the appliance program will be proposed for comment in the near future.

The requirements of § 430.24(h) of the final regulations apply until such time as final labeling requirements for a particular measure of energy consumption and the associated test procedure application provision are prescribed. After that time, representations regarding a measure of energy consumption covered by a labeling rule must be the same as represented on the label.

D. UNIT COSTS OF ENERGY

Under section 323(b)(2) of the Act, FEA is to provide manufacturers information as to the representative average unit costs of energy. This information was provided by notice issued July 11, 1977 (42 FR 36549, July 15, 1977).

E. PREEMPTION

Today's rulemaking prescribing final test procedures for television sets supersedes any State regulation to the extent required by section 327 of the Act. Pursuant to section 327, all State regulations which provide for the disclosure of information with respect to any measure of energy consumption of television sets or which provide for any energy efficiency standard or similar requirement with respect to energy efficiency or energy use of television sets must now employ test procedures identical to those specified in today's final rule.

(Energy Policy and Conservation Act, Pub. L. 94–163, as amended by Pub. L. 94–385; Federal Energy Administration Act of 1974, Pub. L. 93–275, as amended by Pub. L. 94–385; E.O. 11790, 39 FR 23185.)

In consideration of the foregoing, Part 430 of Chapter II of Title 10, Code of Federal Regulations, is amended as set forth below, effective October 17, 1977.

Issued in Washington, D.C., September 8, 1977.

ERIC J. FYGI,
Acting General Counsel,
Federal Energy Administration.

1. Section 430.2 is amended by adding subparagraph (8) as part of the definition of "basic model" and by adding in appropriate alphabetical order definitions of "color television set," "monochrome television set," and "television set" to read as follows:

§ 430.2 Definitions.

* * * * *

"Basic model" means all units of a given type of covered product (or class thereof) manufactured by one manufacturer and—

* * * * *

(8) With respect to television sets, which have identical screen size, which have electrical characteristics that are essentially identical, and which do not have any differing physical or functional characteristics that affect energy consumption.

* * * * *

"Color television set" means an electrical device designed to convert incoming broadcast signals into color television pictures and associated sound.

* * * * *

"Monochrome television set" means an electrical device designed to convert incoming broadcast signals into monochrome television pictures and associated sound.

* * * * *

"Television set" means a color television set or a monochrome television set.

* * * * *

2. Section 430.22 is amended by adding paragraph (h) to read as follows:

§ 430.22 Test procedure for measures of energy consumption.

* * * * *

(h) *Television sets.* (1) The estimated average annual operating cost for television sets shall be the product of:

(i) The average annual energy consumed by the television set in kilowatt-hours per year, determined according to 3.0 of Appendix H of this subpart, and

(ii) The representative average unit cost of energy in dollars per kilowatt-hour as provided by the Administrator, the resulting product then being rounded off to the nearest dollar per year.

(2) The receiver energy efficiency factor for television sets shall be:

(i) For color television sets, the product of the estimated minimum power requirement (.130 kilowatts) and the average annual hours of use (2,200 hr/yr.), divided by the average annual energy consumed by the television set in kilowatt-hours per year, determined according to 3.0 of Appendix H to this subpart. The resultant is then multiplied by 100 and expressed as a percent,

(ii) For monochrome television sets, the product of the estimated minimum power requirement (.040 kilowatts) and the average annual hours of use (2,200 hr/yr.), divided by the average annual energy consumed by the television set in kilowatt-hours per year determined according to 3.0 of Appendix H of this subpart. The result is then multiplied by 100 and expressed as a percent.

(3) Other useful measures of energy consumption for television sets shall be those measures of energy consumption for television sets which the Administrator determines are likely to assist consumers in making purchasing decisions and which are derived from the application of Appendix H of this subpart.

* * * * *

3. Section 430.24 is amended by adding paragraph (h), to read as follows:

§ 430.24 Representations regarding measures of energy consumption.

* * * * *

(h) *Television sets.* (1) Except as provided in paragraph (h)(3) of this section, no manufacturer, distributor, retailer, or private labeler of television sets may make any representation with respect to or based upon a measure or measures of energy consumption described in § 430.22(h) unless a sample of sufficient size of each basic model for which such representation is made has been tested in accordance with applicable provisions of this subpart such that, for each such measure of energy consumption, there is at least 95 percent confidence that the true mean of such measures of the basic model is within ±5 percent of the mean of such measures of the sample.

(2) The sample selected for paragraph (h)(1) of this section shall be comprised of units which are production units, or are representative of production units, of the basic model being tested.

(3) Whenever a rule applicable to television sets is prescribed under section 324 of the Act, this paragraph shall not apply to any label covered by such rule, and all representations of any measure of energy consumption covered by such rule shall be identical to the measure of energy consumption on the label.

* * * * *

4. Subpart B of Part 430 is amended to add an Appendix H, to read as follows:

* * * * *

APPENDIX H—UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF TELEVISION SETS

1. DEFINITIONS

1.1 "IRE-unit flat field" means a specific video electrical signal which results in a particular level of brightness of the television screen as established by the Institute of Radio Engineers.

1.2 "Filament keep-warm" means a feature that provides a voltage to keep vacuum tube and/or picture tube filaments warm for the purpose of allowing almost instantaneous response to the power control switch.

1.3 "Operating time" (t_o) means the hours per year during which the television set is operating with power control turned on.

1.4 "Remote control" means an optional feature which allows the user to control the television set from more than one location by a hand held device.

1.5 "Standby power consumption" (P_s) means the minimum amount of energy consumed with the power control switch turned off.

1.6 "Standby time" (t_s) means the hours per year during which the television set is connected to a power outlet with the power control switch turned off.

1.7 "Vacation switch or master on-off switch" means an optional energy saving feature incorporated into the design of a television set that permits the user to disconnect the filament keep-warm circuit(s).

1.8 "Remote control defeat switch" means a switch which permits the user to disconnect all standby power to a television set.

2. TESTING CONDITIONS AND MEASUREMNTS

2.1 *Test equipment and test signals.* The following equipment and test signals shall be used for testing of television sets.

2.1.1 Regulated power source capable of supplying 120 volts (±1.2 volts) alternating current.

2.1.2 Signal generator capable of producing radio frequency (RF) television test signals, at a convenient very high frequency (VHF) channel, modulated with, National Television System Committee composite video as follows:

2.1.2.1 Standard White Pattern, RF signal modulated to 87 percent with a 100 IRE-unit flat field.

2.1.2.2 Standard Black Pattern, all adjustments as for 2.1.2.1 except modulated with a zero IRE-unit flat field.

2.1.2.3 The test signals in 2.1.2.1 and 2.1.2.2, supplied by a source whose impedance equals the design antenna impedance of the television set under test, shall be adjusted to a level of 70 decibels (dB) ±3dB, referrred to a zero dB level of one femtowatt (1×10^{-15} watt) available power. (For a 300 ohm source, 70 dB referred to one femtowatt corresponds to an open-circuit voltage of 3.5 millivolts. For the calculation of "available power" use American National Standard C.16.13–1961, Method of Testing Monochrome Television Broadcast Receivers.)

2.1.3 Wattmeter capable of measuring the average power consumption of the television set under test. The wattmeter shall be accurate to within 1 percent of the full scale value. All measurements shall be made on the upper half of the scale of the wattmeter.

2.2 INITIAL SET-UP OF TELEVISION SET

2.2.1 Remove all batteries from television sets designed for both battery and alternating current operation. Deactivate all present or automatic controls affecting brightness which are customer options. Adjust all non-customer controls according to the manufacturer's service procedure.

2.2.2 Apply power to the television set under test from the power source specified in 2.1.1 through the wattmeter specified in 2.1.3. Adjust the volume control to the lowest possible setting.

2.2.3 Connect the output of the signal generator as specified in 2.1.2 to the VHF antenna terminals of the television set. Tune the television set to the channel of the RF signal.

2.3 MEASUREMENT OF OPERATING POWER CONSUMPTION (P_o)

2.3.1 Turn on the television set and allow at least five minutes warm-up time. With the synchronization controls adjusted for a stable test pattern, apply the standard white pattern specified in 2.1.2.1 to the television set. Adjust any customer controls other than the volume or synchronization controls for maximum power consumption as indicated by the wattmeter specified in 2.1.3. Illuminate any room illuminance sensor which has not been deactivated, to produce maximum power consumption. Record the white pattern consumption (P_w) as indicated by the wattmeter in watts.

2.3.2 Change the signal source to the standard black pattern specified in 2.1.2.2. Adjust any customer controls, other than the volume or synchronization controls, for the minimum power consumption as indicated by the wattmeter. Cover any room illuminance sensor which has not been deactivated. Record the black pattern power consumption (P_b) as indicated by the wattmeter in watts.

2.3.3 Compute the operating power consumption (P_o) as follows:

$$P_o = \frac{P_w + P_b}{2}$$

where
P_o=operating power consumption in watts
P_w=as determined from 2.3.1
P_b=as determined from 2.3.2

2.4 MEASUREMENT OF STANDBY POWER CONSUMPTION (P_s)

2.4.1 For television sets without either a vacation switch or a remote control defeat switch, turn the power switch off and after two minutes measure the standby power consumption (P_s).

2.4.2 For a television set equipped with a remote control defeat switch, a vacation switch or both, turn the power switch, any vacation switch, and any remote control defeat switch to the lowest energy consuming position. Measure the minimum power consumption (P_{min}). Turn any vacation switch and any remote control defeat switch to the highest energy consuming position and measure the maximum power consumptions, (P_{max}). The standby power is then calculated from the equation:

$$P_s = \frac{(P_{max} - P_{min})}{2} + P_{min}$$

where
P_s=standby power consumption in watts
P_{max}=power consumption, in watts, measured with the television set power switch off and the vacation switch and remote control defeat switch in the highest energy consuming position
P_{min}=power consumption, in watts, measured with the television set power switch off and the vaction switch and remote control defeat switch in the lowest energy consuming position

3.0 *Average Annual Energy Consumption*

$$E = \frac{P_o t_o}{1{,}000} + \frac{P_s t_s}{1{,}000} = 2.2P_o + 6.56P_s$$

where
E=total average annual energy consumed by the television set (kilowatt-hour per year)
P_o=operating power consumption as computed in 2.3.3
t_o=operating time, 2,200 h/yr
P_s=standby power consumption computed in 2.4
t_s=standby time, 6,560 h/yr

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